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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10291	7590	03/13/2006	EXAMINER	
RADER, FISHMAN & GRAUER PLLC 39533 WOODWARD AVENUE SUITE 140 BLOOMFIELD HILLS, MI 48304-0610			BAUER, SCOTT ALLEN	
			ART UNIT	PAPER NUMBER
			2836	

DATE MAILED: 03/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/731,560	Applicant(s) GUO, SAM Y.	
	Examiner Scott Bauer	Art Unit 2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 11-34 is/are rejected.
- 7) ☒ Claim(s) 8-10 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/09/2003</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Claims 1-12 & 27-31 in the reply filed on January 16, 2006 is acknowledged. The traversal is on the ground(s) that the inventions of the two species are not independent and that the subject matter of the of both species is sufficiently related and that a thorough search for the subject matter of one claim group would encompass a search for the subject matter of the other group. The arguments are persuasive and the restriction requirement is withdrawn.

Specification

2. The disclosure is objected to because of the following informalities: The Examiner believes the reference "C3", found in line 9 of paragraph 0029, should be changed to read --C5--. Appropriate correction is required.

Claim Objections

3. Claim 30 is objected to because of the following informalities:
4. Claim 30 recites the limitation "*said driving voltage*" in lines 1 & 2. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

5. Claim 30 is further objected to as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 30 recites that "*said driving voltage is alternately connected and disconnected from said driving voltage by a switch*". As written the meaning of the phrase is unclear as it teaches that the driving voltage can be connected and disconnected from itself.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-6, 12, & 27-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Stoll et al. (US 4,925,156).

8. With regard to Claim 1, Stoll et al., in Figure 2, discloses a circuit for driving a coil-armature device (10), comprising: a first switch which generates a switching signal configured to selectively activate the circuit (column 4 lines 9-12); a pulse width modulation signal generator (53); a second switch (27), responsive to said pulse width modulation signal generator, that causes a driving voltage source to periodically energize the coil-armature device according to a duty cycle; and a means (38) for selectively providing a signal from said pulse width modulation signal generator to said

second switch after a determined time has elapsed after activation of the circuit (column 1 lines 13-20).

The first switch is not shown in Figure 2, however the first switch is coupled to terminals 11 & 12 (column 4 lines 9-12).

9. With regard to Claim 2, Stoll et al., in Figure 2, discloses the circuit according to claim 1, wherein said elapsed time period corresponds to an amount of time required to sufficiently energize the coil armature device such that the armature is attracted into a center of the coil (column 4 lines 65-68 & column 5 lines 1-7).

10. With regard to Claim 3, Stoll et al., in Figure 2, discloses the circuit according to claim 1, wherein said elapsed time period corresponds to a time required to charge a capacitor (20) from a first charge level to a second charge level (column 4 lines 65-68 & column 5 lines 1-7).

11. With regard to Claim 4, Stoll et al, in Figure 2, discloses the circuit according to claim 1, wherein said means (38) for selectively providing a signal from said pulse width modulation signal generator (53) to said second switch (27) comprises a NAND gate responsive to a first input signal and said pulse width modulation signal (column 6 lines 25-54).

12. With regard to Claim 5, Stoll et al., in Figure 2, discloses the circuit of claim 4, wherein the first input signal to the NAND gate (38) is derived from a voltage level across a capacitor (20) (column 6 lines 25-54).

13. With regard to Claim 6, Stoll et al., in Figure 3, discloses the circuit according to claim 4, wherein said first input signal has a first voltage level upon activation of said circuit, and wherein said first input signal changes to a second voltage level after said determined time period has elapsed (Fig.3 U37).

14. With regard to Claim 12, Stoll et al., in Figure 2, discloses the circuit according to claim 1, wherein said second switch (27) is a transistor.

15. With regard to Claim 27, Stoll et al., in Figure 2, discloses a method of selectively energizing an armature-coil device (10), comprising the steps of: energizing the coil to a first energy level for a period of time sufficient to retract the armature to a center of the coil; and energizing the coil to a second energy level subsequent to said time period sufficient to retract the armature to the center of the coil (column 6 lines 25-54).

16. With regard to Claim 28, Stoll et al., in Figure 2, discloses the method of claim 27, wherein said first energy level is greater than said second energy level (column 1 lines 13-20).

17. With regard to Claim 29, Stoll et al., in Figure 2, discloses the method of claim 27, wherein: said first energy level is generated by connecting a driving voltage to the coil for a continuous amount of time; and said second energy level is generated by alternatively connecting and disconnecting said driving voltage to the coil according to a duty cycle (column 6 lines 25-54).

18. With regard to Claim 30, Stoll et al., in Figure 2, discloses the method of claim 27, wherein said driving voltage is alternatively connected and disconnected from said driving voltage by a switch (27) that is alternatively turned on and turned off in response to a control signal (column 6 lines 25-54).

19. With regard to Claim 31, Stoll et al., in Figure 3, discloses the method of claim 30, wherein said control signal is a pulse-width modulated signal. Applicant defines a pulse-width modulated signal as a signal that oscillates between a high and low voltage level, with an oscillation frequency determined by a time constant (paragraph 0015 lines 17-19). Fig. 3 demonstrates that the control signal is a pulse-width modulated signal.

20. Claims 13-25, 27, 28 & 32-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Hansen et al. (US 5,910,890).

21. With regard to Claim 13, Hansen et al., in Figure 2, discloses a circuit (30) for driving a coil-armature device (20, 21, 22 & 24), comprising: a first switch, configured to

selectively activate the circuit (column 2 lines 61-67); and a second switch (Q2), responsive to a control signal, that causes a driving voltage source to periodically energize the coil-armature device according to one of a first duty cycle and a second duty cycle (column 1 lines 62-67 & column 2 lines 1-9).

22. With regard to Claim 14, Hansen et al., in Figure 2, discloses the circuit according to claim 13, wherein said second switch is a transistor.

23. With regard to Claim 15, Hansen et al., in Figure 2, discloses the circuit according to claim 13, wherein: the second switch is configured to periodically energize the coil-armature device according to the first duty cycle for a determined period of time sufficient to move the armature to a center of the coil, and the second switch is configured to periodically energize the coil-armature device according to the second duty cycle subsequent to the period of time sufficient to move the armature to the center of the coil (column 1 lines 62-67 & column 2 lines 1-9).

24. With regard to Claim 16, Hansen et al., in Figure 2, discloses the circuit according to claim 13, further comprising a first comparator (60) configured to generate a control signal in response to a comparison between a voltage signal indicative of an amount of energy stored in said coil-armature device and a first reference signal (column 4 lines 61-67 & column 5 lines 1-31).

25. With regard to Claim 17, Hansen et al., in Figure 2, discloses the circuit of claim 16, wherein said voltage signal indicative of an amount of energy stored in said coil-armature device is generated across a resistor (R16) connected in series with the coil-armature device (20).

26. With regard to Claim 18, Hansen et al., in Figure 2, discloses the circuit of claim 16, wherein: the first reference signal has a first voltage level during a time period sufficient to move the armature to a center of the coil, and said first reference signal has a second voltage level subsequent to said time period sufficient to move the armature to the center of the coil (column 5 lines 32-48).

27. With regard to Claims 19-21, Hansen et al., in Figure 2, discloses the circuit of claim 16, wherein said first reference signal is generated from a voltage divider circuit, wherein said voltage divider circuit is adjustable so as to be able to change said first reference signal in response to a circuit mode signal, wherein the voltage divider comprises a plurality of resistors (R12-R14), and wherein at least one of the resistors (R12) is configured to be electrically shorted from said voltage divider in response to a circuit mode signal (column 5 lines 32-48).

28. With regard to Claims 22-24, Hansen et al., in Figure 2, discloses the circuit of claim 21, further comprising a second comparator (56) that compares a second input signal to a second reference signal to generate said circuit mode signal, wherein said

Art Unit: 2836

second input signal is generated based on a voltage level across a capacitor (C5), wherein said capacitor is sized so that said second input signal exceeds said second reference signal after a determined time sufficient to move the armature to a center of the coil has elapsed (column 5 lines 32-48).

29. With regard to Claim 25, Hansen et al., in Figure 2, discloses the circuit of claim 22, wherein the second input signal is configured to exceed said second reference signal after a determined time sufficient to move the armature to a center of the coil has elapsed (column 5 lines 32-48).

30. With regard to Claim 27, Hansen et al., in Figure 2, discloses a method of selectively energizing an armature-coil device (20), comprising the steps of: energizing the coil to a first energy level for a period of time sufficient to retract the armature to a center of the coil; and energizing the coil to a second energy level subsequent to said time period sufficient to retract the armature to the center of the coil (column 1 lines 61-67 & column 2 lines 1-9).

31. With regard to Claim 28, Hansen et al., in Figure 2, discloses the method of claim 27, wherein said first energy level is greater than said second energy level (column 2 lines 3-9).

32. With regard to Claim 32, Hansen et al., in Figure 2, discloses the method of claim 27, wherein: the first energy level is generated by alternatively connecting and disconnecting a driving voltage to the coil according to a first duty cycle; and said second energy level is generated by alternatively connecting and disconnecting said driving voltage to the coil according to a second duty cycle coil (column 1 lines 61-67 & column 2 lines 1-9).

33. With regard to Claims 33 & 34, Hansen et al., in Figure 2, discloses the method of claim 32, wherein said first duty cycle and said second duty cycle are determined based upon a comparison of a first reference signal to a signal indicative of an amount of energy stored in the coil wherein the first reference signal has a first value during said period of time sufficient to retract the armature to the center of the coil; and said first reference signal has a second value subsequent to said period of time sufficient to retract the armature to the center of the coil (column 4 lines 61-67 & column 5 lines 1-48).

Claim Rejections - 35 USC § 103

34. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stoll et al. as applied to claim 4 above, and further in view of Briedis et al. (US 5,510,951).

36. With regard to Claim 7, Stoll et al. teaches the circuit according to claim 4.

Stoll et al. does not teach that the pulse width modulation generator is configured to alternatively provide a first voltage level that is greater than an upper threshold voltage of said NAND gate and a second voltage level that is less than a lower threshold voltage of said NAND gate.

Briedis et al., in Figure 1, teaches an electronic control for 3-wire DC coils wherein a NAND gate (B) is used to change a solenoid (14) from a first energy level to a smaller energy level. When capacitor C1 becomes fully charged, NAND gate B is input to NAND gate A. Briedis et al. further teaches that the inputs of the NAND gates have Schmitt trigger characteristics (column 3 lines 28- 32) which is configured to alternatively provide a first voltage level that is greater than an upper threshold voltage of said NAND gate and a second voltage level that is less than a lower threshold voltage of said NAND gate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Stoll et al. with Briedis et al., by using NAND gates with Schmitt triggers in the circuit by Stoll et al., for the purpose of providing noise immunity to the circuit when the input signal is near the thresholds.

37. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stoll et al. as applied to claim 1 above, and further in view of Hansen et al. (US 5,910,890).

38. With regard to Claim 11, Stoll et al. teaches the circuit according to claim 1.

Stoll et al. does not teach that the circuit further comprises a relay connected between said second switch and said means for selectively providing a signal from said pulse width modulation signal generator to said second switch.

Hansen et al., in Figure 2, teaches a transistor (Q3), which is an art recognized functional equivalent of a relay, connected between the second switch and the means for selectively providing a signal from the pulse width modulation signal generator to the second switch.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Stoll et al. with Hansen et al., by providing a relay between the second switch a means for selectively providing a signal from the pulse width modulation signal generator taught by Stoll et al., for the purpose of providing a large amount of current to the base of transistor 27 in high current situations without damaging the NAND gate (38), and to use a relay instead of a transistor for the purpose of reducing the capacitance at the input of the NAND gate.

39. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hansen et al. (US 5,910,890).

40. With regard to Claim 26, Hansen et al. in Figure 2 teaches the circuit according to claim 16.

Hansen et al. does not teach a relay positioned between the first comparator and the second switch.

Hansen et al., does however teach that a transistor (Q3) is positioned between the first comparator (60) and the second switch (Q2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a relay instead of a transistor as the two are art recognized functional equivalents of each other, A relay is used instead of a transistor for the purpose of allowing the switch to draw more current and to eliminate capacitance in the circuit that would slow circuit operation.

Allowable Subject Matter

41. Claims 8-10 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

42. Claim 8 would be allowable if rewritten in independent form including all of the limitations of the base claim because the prior art of record does not teach or fairly suggest the circuit according to claim 1 wherein the pulse width modulation signal generator comprises an inverter and a feed-back loop configured to generate an input signal to the inverter based upon the output of the inverter.

While Stoll et al. teaches that the generator contains a feed-back circuit (22-24) the circuit does not provide feed-back to an inverter. Stoll et al. also teaches an inverter (35), however, the inverter is not part of the PWM generator not does the inverter have feed-back.

43. Claims 9 & 10 would be allowable as they depend from Claim 8, which would also be allowable if rewritten in independent form including all of the limitations of the base claim.

Conclusion

44. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott Bauer whose telephone number is 571-272-5986. The examiner can normally be reached on M-F 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on 571-272-2058. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAB
02/24/2006



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